

AYRES (S.C.)

PARACENTESIS OF THE CORNEA,

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• CINCINNATI, OHIO.

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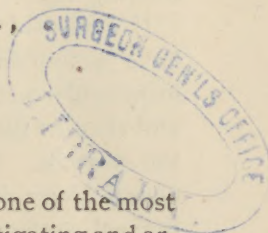
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Paracentesis of the cornea is undoubtedly one of the most efficient means in our hands, of treating, mitigating and arresting many of the diseases to which this very important part of the eye is subject. The value of the cornea as it is related to the dioptric apparatus cannot be overestimated. It is in one sense as essential to vision as the retina, for if its property of transmitting rays of light be destroyed, the eye is almost as blind as if the retina was seriously diseased. A very thin opacity of the cornea or even a slight irregularity of its epithelium will cause decided impairment of vision, whereas we may have extensive disease of the retina and choroid and at the same time excellent vision, providing the region of the macula lutea is not involved. From the construction of the eye it is necessary for rays of light to pass through the cornea in order to impinge upon the retina, and everything which interferes with this, to the same degree affects the vision. If the lens becomes opaque we can remove it, but not so with the cornea. The want of the former may be supplied by placing a convex lens in front of the eye, but the loss of the latter is irretrievable.

Corneal affections constitute a large proportion of the eye diseases to which children as well as adults are subject. They are dangerous from the permanent opacities which



generally remain in the cornea, but are far more serious from the liability of the ulcers to perforate. An opacity of the cornea may in course of time be absorbed to some degree at least, and thus improve the impaired function of vision, or an artificial pupil favorably located, may accomplish the same result where there is no hope of the cornea clearing up.

If a corneal ulcer perforates spontaneously, we generally have a sudden escape of the aqueous. This from the intra-ocular pressure usually causes a prolapse of the iris, and then as the ulcer heals, we have the iris imprisoned in the cicatrix. When the ulcer is allowed to take its own course there is usually an extensive involvement of the corneal surface before it gives way and a proportionately large prolapse of iris. It not unfrequently happens that after spontaneous perforation the ulcer heals and the iris remains imprisoned in the wound, thus forming a pear shaped pupil, and that this condition of things continues for years without any further serious complications.

This, unfortunately, is not the termination of all perforating ulcers. Instead, we not unfrequently have a train of subsequent complications, ending in total loss of the eye. These show themselves in the form of chronic recurrent iritis, in staphyloma of the cornea, irido-chroiditis irido-cyclitis, secondary glaucoma and general atrophy of the ball.

Now the danger to the eye is not so much from the perforation itself as from the method in which it takes place. It is in one sense a natural result of the forces acting within the eye. As the ulceration proceeds and gradually thins the cornea the intra-ocular pressure forces the weakened portion out, and when it can no longer resist, the rupture takes place and the aqueous escapes.

The *rationale* then of the operation of paracentesis cornea is this, that we only anticipate an event which will subsequently happen, but with this advantage that we are able

to regulate the escape of the aqueous and prevent a prolapse of the iris. But we do more than this, we arrest the ulcerative process, limit the extent of corneal tissue involved, and thus diminish the size of the resulting opacity. The paracentesis once made, we can subsequently, by opening the wound with a blunt probe, cause the aqueous to drain off, if it may be necessary, and thus keep the ocular tension down and relieve the engorged blood vessels, restore the normal circulation and give the corneal tissue a chance to repair. We thus prevent those serious and often fatal complications to which reference was made above.

METHOD OF PERFORMANCE.

It is easily done with an ordinary Graefes cataract knife. With this one can make a larger or smaller incision, as may be indicated by the condition and situation of the ulcer. Whether one proposes to make an incision such as is described by Saemisch, or merely to perforate the cornea through the floor of the ulcer, this form of knife will be found most useful. The stop needle would be better suited to the use of general practitioners as there is a shoulder about 1''' from the point of the blade, which prevents it from entering the cornea further, and thus endangering the capsule of the lens.

A cataract needle makes too small an opening. There is a constant tendency in the corneal wound to close, and it is often desirable to prevent this, which is most easily done by making the original incision large enough to allow the aqueous to flow off freely, and permit the incision to be easily opened afterward with a probe.

In making the operation, it is better to place the patient in the recumbent posture, the head is thus more easily controlled and the patient prevented from dodging back from the point of the knife. The lids may be separated by an assistant, and thus do away with the use of the spring

speculum, which is as painful as the puncture itself, and is likely to cause a sudden escape of aqueous. It is better to fix the eye with the fixation forceps, as it enables the operator to make the puncture more accurately. Still it can be done without this where patients have considerable self control. The puncture is most easily made through the floor of the ulcer. The knife should be passed in obliquely so that its point can be seen to enter the chamber. If it is desirable to make only a small opening it should be immediately withdrawn, but if a larger one is intended, a slight motion forward of the point of the knife can be made as it is withdrawn and the length of the incision increased.

The operation recommended by Saemisch is applicable to a large number of cases, and its results have, in the hands of most operators, been very satisfactory. It is made in the following manner: The puncture is made on one side of the cornea in healthy tissue, after entering the chamber the knife is pushed rapidly across, and the counter-puncture made in the sound cornea directly opposite. Then the section of the cornea is slowly completed, so as not to allow a too rapid escape of the aqueous. The incision is thus made through the deepest portion of the ulcer, and as it is long, it does not close as quickly as the simple puncture. The advantages of this are that the aqueous flows off for several hours, or even days, as fast as it is secreted, and that when the wound does close, it is more easily opened with a blunt probe than a smaller one would be. The use of an anæsthetic is a question of considerable importance. The operation can frequently be done without it, but in children and in nervous persons and particularly where they have been suffering for a long time, it is better to administer ether. There is occasionally violent pain for half an hour or more after its performance; some suffer from a feeling of faintness, and others from nausea.

The great advantage of the anæsthetic is that one is enabled to perform the operation thoroughly, and to remove

coagula which form in the anterior chamber. The subsequent treatment is simple enough. The patient should remain in the recumbent posture for an hour or two. The pain immediately after the operation is sometimes very severe, but it usually does not last longer than fifteen or twenty minutes; if it should be unusually severe, a hypodermic injection of morphine may be given. Cold external applications, the compress bandage, and atropine should be ordered as they are indicated.

It is not my object in this paper to do more than indicate the various affections in which this simple operation has proved efficient. It would be out of place to go into a detailed treatment of the diseases mentioned, as a few characteristic cases will serve to illustrate the value of the paracentesis.

1st. In ulceration of the cornea:

This is at all times a matter of serious importance to the sight. It is almost certain to leave an opacity which will interfere more or less with vision especially if it be centrally located. It is possible for an ulcer to perforate spontaneously without a prolapse of the iris, but the general rule is that the cornea does not give way until an extensive surface is involved, and then the aqueous escapes with a gush and draws the iris into the perforation. It not unfrequently happens that after this the inflammation gradually subsides, and the iris remains imprisoned in the cornea. Vision in such cases is but slightly impaired, and the eye may remain good for a life-time; on the other hand, the ill effects which may result from a perforation of the cornea are numerous. The iris which in one case will remain quietly imprisoned in the cornea, will in another resent the restraint and suffer from repeated attacks of iritis. The cornea also may become staphylomatous or flattened, and in course of time the ciliary body, and choroid, and vitreous become involved, and the termination will be in disorganization of the eye.

As in every disease, we endeavor to use all the means in our power to conduct the case to a safe termination, and to employ those agents which experience has proven to be most efficient, so in ulceration of the cornea we have frequent resort to the operation of paracentesis. A few cases selected from a large number will serve to illustrate its use.

Case I. J. T., aet. 19, has been suffering severely for several days with an ulcer situated in the lower segment of the right cornea. There is iritis with marked injection in the ciliary region. Paracentesis through the floor of the ulcer made May 22, 1873. The relief was prompt and decided, and there was no return of the severe pain. The ulcer gradually filled up, and there was no need of repeating the operation.

Case II. J. H., aet. 20, has been suffering from ulceration of the cornea for about two weeks past. It is of the phagedenic variety, and extends over about two-thirds of the cornea, but is quite superficial. The pupil dilates only moderately under the energetic use of atropine, but the injection and tenderness in the ciliary region persist. May 26, 1873, made paracentesis. The next day there was marked improvement in his condition. The pain was relieved and the injection in the ciliary region much less. He made a rapid recovery.

Case III. M. D., aet. 10, has an extremely painful ulcer on the outer and lower quadrant of the right cornea. Its edges are abrupt and sharply defined and the cornea around it shows a grayish infiltration. Atropine has but little effect in dilating the pupil, and its anodyne effects are very transient. I operated in this case without giving the child an anæsthetic. The first puncture gave decided relief, but it had to be repeated twice. In this case it was interesting, as well as instructive, to watch the gradual dilatation of the pupil under atropine as the inflammation subsided.

Case IV. J. C. R., aet. 64, has had chronic trachoma for several months past. The granulations are nearly cicatrized now, but he has an ulcer on the right cornea which is causing him intense pain. Paracentesis August 4, 1874. He had relief for three days, but it had to be repeated on the 7th. He had but little pain until the 14th, when it again became severe. Paracentesis was again made, and the aqueous evacuated on the two following days, and on the 17th, he was entirely free from pain. The cornea cleared up quite satisfactorily, and he made a good recovery.

These cases, taken from patients of different ages and with different varieties of ulceration, show that, while the operation may give relief the first time, yet it is not always the case. The fact that one puncture does not suffice should not discourage us from making another. While in a large majority of cases, the aqueous need not be evacuated more than once or twice, yet it occasionally happens that it will be required several times.

Rules which will apply to ulcerations from general causes will also apply to those occurring in purulent ophthalmia of new born infants as well as adults. It is not always possible, on account of the swelling of the lids and œdema of the conjunctiva, to make a paracentesis, but where it is possible, it should not be delayed nor neglected. In fact, there is more urgent need of this operation on account of the destructive tendency of purulent ophthalmia.

Only a short time ago, in a case of ophthalmia neonatorum, the cornea in one eye was ulcerated when first seen. For a while it did well, and the cornea improved, but afterward became painful and the ulcerative process increased. The cornea appeared to be yielding to the intra-ocular pressure, and bulging forward. The child suffered severely, and there was danger that its crying would rupture the cornea, and cause prolapse of the iris, if not something more serious. To prevent this a paracentesis was

made. The ulcer soon began to fill up, the pain was relieved, and the threatened danger averted, and I had the satisfaction of seeing the cornea clear up so far that an iridectomy will some day give the eye a tolerable amount of vision.

If I might presume to formulate any rules on this subject, I would advise :

1. When the ulcer is evidently progressive, and does not yield to atropine, rest and anodynes, it is better to perforate at once, so as to relieve the pain and prevent the further involvement of the cornea.

2. It is especially advisable in children to administer ether, so as to be able to inspect the eye and make the puncture without risk of wounding the lens.

3. The wound should be opened every day until the pain is relieved, and the ulcer shows decided symptoms of improvement.

4. In case of relapse the paracentesis should be resorted to without delay.

HYPOPION KERATITIS.

What I have said above in relation to ulceration of the cornea, will apply with double force to this dangerous and complicated affection. The presence of pus in the anterior chamber is at all times an evidence of a high grade of inflammation. The pus is derived not only from the iris, which is frequently involved in keratitis, but also from Descmets membrane. It sinks by force of gravity to the bottom of the anterior chamber, and appears as a small, white line across the lower border of the cornea. If it is liquid it will change its position corresponding to that of the patient's head.

It sometimes happens that the presence of the hypopion is not known until after a paracentesis has been made. As the last of the aqueous escapes, a drop or two of liquid pus are mingled with it. The development of hypopion is pre-

ceded by severe pain, considerable ciliary injection, and decided photophobia. The quantity may be so slight as to be scarcely detected, and, on the other hand, so extensive as to fill the entire chamber, and obscure the iris.

Of all the remedies used in the treatment of hypopion keratitis, the paracentesis is our most valuable aid. We should not hesitate to resort to it, and it should be repeated daily until the tendency to suppuration is checked. I think it a good plan in these cases, after the incision in the cornea has been made, to press the upper lip of the wound backward, so as to allow a more ready escape of pus and coagula from the chamber.

The following cases are characteristic :

Case I. H. K., aet. 16, a delicate boy quite tall for his age, and of a strumous diathesis. He is suffering from superficial phagedenic ulceration of the cornea. The pain is severe and does not yield to anodynes and the usual local treatment. There is iritis and hypopion, and the aqueous is quite turbid. June 13th, 1873, made paracentesis. June 20th, has been relieved of pain ever since the operation. The inflammation of the cornea rapidly subsided.

Case II. J. S., aet. 31, has had superficial ulceration of the cornea for the past three weeks. There is considerable hypopion, and his suffering is intense. August 31, 1873, evacuated the aqueous by puncture through the floor of the ulcer. The next day the hypopion had again made its appearance, and the paracentesis was repeated. On the third and fourth days the incision was opened, although there was no hypopion. After this he made a favorable recovery without relapsing.

There are often found in the anterior chamber tough masses of lymph, which it is desirable to remove if it can be done without violence to the eye. They are often drawn into the incision by the gush of aqueous, and can then be easily removed with a pair of fine toothed forceps. In case they do not present themselves in this way it is better to let them alone.

ULCUS SERPENS.

This is not a common form of keratitis. It is extremely obstinate and very painful. The pain and suffering are out of all proportion to the surface involved. You will some times see only a small grayish, slightly curved line upon the cornea. It is apparently not deeper than the epithelium, and yet the pain is most excruciating. It is occasionally observed starting from the margin of the cornea, and gradually extending like a grayish line across to the opposite side. It progresses very slowly and shows but little disposition to perforate.

Atropine, anodynes, leeches, warm and cold applications have but little more than temporary influence over it. It is in this form of keratitis that paracentesis achieves some of its best results.

During the past few weeks an instructive case of this kind has been under my observation:

J. McC., aet. 25, has been suffering for some weeks with a very painful ulcer of the left eye. There is at this time (March 15, 1877), a small grayish line of infiltration extending upward from the lower margin of the cornea about one-fourth its diameter. Under the effects of atropine morphine, the compress bandage, and warm applications, there was a decided improvement in a short time, and he went home with prospects of a speedy recovery. In a few days, however, he returned, suffering more severely even than at first. The progress of the ulcer had been only arrested, not permanently checked. The grayish line of the ulcer extended further over the cornea and showed a decided disposition to advance.

I made a paracentesis in the course of the ulcer, cutting directly across it. The relief was decided but not permanent. The aqueous was evacuated by springing the incision with a probe, but in spite of this the pain returned every time the wound closed. I then made another and a more lib-

eral paracentesis directly through the extreme limit of the ulcer which had by this time reached the center of the cornea. This sufficed to arrest the progress of the disease, and he returned home shortly, and there has been no relapse since. It is more than probable that if the operation had been made at his first visit, it would have prevented the necessity of the second.

IN LUXATION OF THE LENS INTO THE VITREOUS.

This is a serious accident, and is often followed by glaucomatous hardness of the ball, liquefaction of the vitreous, or even by suppuration of the entire eye. I have lately had an opportunity of watching the favorable effects of paracentesis cornea in a case of luxation of the lens. It was in the person of a laborer about sixty years of age. While splitting a stick of kindling, one end of it struck him and inflicted a wound extending from the inner canthus of the left eye over the corresponding side of the nose. There was great oedema of the lids and chemosis of the conjunctiva. Vision was reduced to bare perception of light, owing to intra-ocular hemorrhage. In consequence of the turbidity of the vitreous it was impossible to determine the position of the lens, but from the tremulousness of the iris it was evident that it had been luxated. The swelling subsided under the influence of cold external applications, but he had repeated attacks of pain which threatened destruction of the eye if they did not render enucleation necessary. The tension of the eye was $+2$, and knowing that this condition of things could not last long and the integrity of the retina be preserved, I made a paracentesis. Its effects were all I could ask, the pain was relieved and the intra-ocular tension diminished. The operation had to be repeated several times, but the ball gradually resumed its natural color and the media cleared up so that the lens could be seen in the vitreous.

Another case under the care of my associate, Dr. E. Williams, was equally relieved by the paracentesis. The patient, a man of seventy years of age, had had the lens of the right eye luxated about three weeks previously, and had suffered intense pain all this time. The pupil was widely dilated, the ball very hard and extremely tender to the slightest pressure. A single puncture with a Graafe's knife had the effect to reduce the increased tension of the ball and relieve the pain. In this case there was no intra-ocular hemorrhage. The lens was lying in the vitreous close behind the ciliary processes.

IN IRITIS.

In some forms of iritis a paracentesis is strongly indicated. Where the pain is severe, with marked injection in the ciliary region, and where the pupil dilates only moderately under the liberal use of atropine, although there are few posterior synechiar, I have found a paracentesis of invaluable service. The violence of the pain is speedily subdued, the ciliary injection relieved, and the pupil dilates as soon as the ocular tension is diminished by the operation.

One case in point will suffice:

Mr. B., aet. 37, has suffered a violent attack of iritis, first in his right eye and afterwards in his left. He recovered from both after a tedious course of treatment. About six months after his recovery from the second he had another attack in his right eye. Atropine, warm poultices, anodynes and alteratives were tried for a short time as they had been in the previous treatment, but their effects were not satisfactory. I then made a paracentesis, which had a most decided effect in arresting the progress and shortening the course of inflammation and he made a rapid and satisfactory recovery.

I have thus hastily glanced at some of the more important diseases in which this operation is useful. It would

not be over-estimating its value to say, that without it we would be deprived of one of our most reliable means of combating several of the most dangerous diseases to which the eye is subject. It is within the power of every practitioner to take advantage of it, and thus relieve suffering, and at the same time add something to his own credit, professionally. I can most cordially recommend the operation to your favorable consideration.

